UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,791	02/27/2004	Sophia W. Kao	RZMI-P321	9433

32986 7590 05/16/2007	EXAMINER	
IPSG, P.C. P.O. BOX 700640 SAN JOSE, CA 95170-0640	ROSE, HELENE ROBERTA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/789,791	KAO, SOPHIA W.
	Examiner	Art Unit	
	Helene Rose	2163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 March 2007</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-22</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-22</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>27 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Detailed Action

1.   In response to communication filed on 3/7/2007, Claims 1, 14, 15, 22, were

amended. No claims were added or cancelled. Therefore, Claims 1-22 is presently

pending.

Claim Rejections - 35 USC § 112

2.   In view of Claim 22 being rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject

matter which applicant regards as the invention, wherein   Claim 22, recite 35 USC 112,

sixth paragraph " means for" language.

       Examiner withdraws the pending rejection based on applicant' s amendment.

Claim Rejections - 35 USC - 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed
> or described as set forth in section 102 of this title, if the differences between
> the subject matter sought to be patented and the prior art are such that the
> subject matter as a whole would have been obvious at the time the invention was
> made to a person having ordinary skill in the art to which said subject matter
> pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

4.   Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Melchior (US Patent No. 6,226,710, Date of Patent: May 1, 2001) in view Hariguchi (US

Patent No. 6,307,855/ Date of Patent: Oct. 23, 2001, hereinafter Hariguchi 855) and

further in view of Hariguchi et al (US Patent No. 6,717,946/Date of Filed: Oct. 31, 2002,

hereinafter Hariguchi 946).

Claim 1:

Regarding Claim 1, Melchior teaches wherein an action group arbitration system,

comprising:

a searchable memory block having a first type memory portion and a second type

memory portion, wherein the searchable memory block is configured with a plurality of

entries, the plurality of entries configured to provide a search result in response to a

search key (column 3, lines 30-35, wherein the CAM will simultaneously examine all of

its entries, wherein " entries" is interpreted to be the " plurality of entries" , and

select the stored data, i.e., association, that matches the key; column 12, lines 17-20,

wherein CAM engine support two types of RAM table widths, normal tables and extra-

wide tables, in which CAM is the " searchable memory" ; and columns 14-15, lines 59-

67 and lines 1-20, wherein CAM engine 100 implements a simple hierarchical search

capability, wherein a CAM table implemented in RAM, i.e., parent table may be

.designated as having another specific table as a child, wherein table 1 having ……, table

2 having ………, and wherein the key being searched for is automatically masked to the

length of the key of the child table, thereby by preserving the high order bytes of the

key, and the child table, i.e., table 2, is searched and, if an exact match is not found and

the child table has another subsequent child table, i.e., table 3, the CAM engine

automatically cascades to the new child table and the search process is repeated, and

as soon as a match is found in a child table the corresponding action is returned ~

wherein this is overall equivalent to " a searchable memory block having a first type memory portion and a second type memory portion wherein the searchable memory block is configured with a plurality of entries, the plurality of entries configured to provide a search result in response to a search key ~ Melchior);

Melchior does not teach wherein a first table having a each of the plurality of stored values corresponds with one of the plurality of entries, the first table configured to receive the search result and to provide a selection signal in response to the search result, the selection signal corresponding with at least one of the plurality of entries, wherein each of the plurality of entries include a first state and an associated stored value having an enable state.

Melchior does not teach wherein a second table configured to receive the selection signal and to provide an action indication in response to the selection signal.

On the other hand, Hariguchi 855 does teach wherein:

a first table having a each of the plurality of stored values corresponds with one of the plurality of entries (column 7, lines 60-61 and column 8, lines 43-46, wherein hit entry address is connect to memory containing the associated value of the CAM entry, i.e., routing table entry information used in routing, Hariguchi 855), the first table configured to receive the search result and to provide a selection signal in response to the search result (column 6, lines 35-42, wherein this reads over " no hit" signals and " hit" signals and so forth, Hariguchi 855), the selection signal corresponding with at least one of the plurality of entries, wherein each of the plurality of entries include a first state and an associated stored value having an enable state (column 10, line 32, wherein

set data enable line for CAM cells to 1, which is interpreted to be enabled, Hariguchi,

855); and

Hariguchi 855 does teach wherein:

a second table configured to receive the selection signal and to provide an action

indication in response to the selection signal (column 6, lines 55-58, wherein a

prioritizer for selecting a single routing entry address from the set of table entry hit

addresses and a memory for producing the associated table entry from the single

routing entry address, Hariguchi 855).

It would have been obvious to one of the ordinary skill in the art at the time of

the invention to incorporate Hariguchi 855 teachings into Melchior system. A skilled

artisan would have been motivated to combine as suggest by Hariguchi 855 [column

6,lines 18-25 and 35-42] for providing a high-speed routing table that is capable of

selecting the most specific address match among the results.

Claim 2:

Regarding Claim 2, the combination of Melchior in view of Hariguchi 855 teaches

wherein the first type memory portion includes static random access memory (SRAM)

(column 1, lines 57-60, respectively, Melchior)

Claim 3:

The combination of Melchior in view of Hariguchi 855 does not teach wherein

wherein the second type memory portion includes ternary content addressable memory

(TCAM).

On the other hand, Hariguchi 946 does teach wherein the second type memory portion includes ternary content addressable memory (TCAM) (column 5, lines 25-30, resepectively, Hariguchi, 946).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate Hariguchi 946 into Melchior and Hariguchi 855 system. A skilled artisan would have been motivated to combine as suggest by Hariguchi 946 [see abstract] for providing a more efficient data search in very short, fixed time period.

Claim 4:

Regarding Claim 4, combination of Melchior in view of Hariguchi 855 and further in view of Harguichi 946 teaches wherein the first and second type memory portions include a plurality of entries (column 7, lines 60-61,respectively, Hariguchi 855 and Also see, Melchior ~ column 2, lines 30-32).

Claim 5:

Regarding Claim 5, combination of Melchior in view of Hariguchi 855 and further in view of Harguichi 946 teaches wherein for each of the plurality of entries, an entry in the first table includes a plurality of the stored values (Refer to claim 1, wherein this limitation is rejected under the same rationale, Hariguchi 855).

Claim 6:

Regarding Claim 6, combination of Melchior in view of Hariguchi 855 and further in view of Harguichi 946 teaches wherein each of the stored values corresponds to an action group (column 5, lines 63-65, wherein the term subset is used to indicate a group of all or less than all of the elements of a set and column 6, lines 40-43, wherein a

subset of multiple mapped subtrie values each include a continuous set of one or more

wildcards, the position of the contiguous set of one or more wildcards identifying values

within the range, Hariguchi 946).

Claim 6:

Regarding Claim 6, combination of Melchior in view of Hariguchi 855 and further

in view of Hariguchi 946 teaches wherein each of the stored values corresponds to an

action group (column 5, lines 63-65, wherein the term subset is used to indicate a group

of all or less than all of the elements of a set and column 6, lines 40-43, wherein a

subset of multiple mapped subtrie values each include a continuous set of one or more

wildcards, the position of the contiguous set of one or more wildcards identifying values

within the range, Hariguchi 946).

Claim 7:

Regarding Claim 7, combination of Melchior in view of Hariguchi 855 and further

in view of Hariguchi 946 teaches wherein the first state includes a hit or match

indication (see abstract, wherein uses the mask information from masking circuits of the

matching entries to select the best entry, e.g., having the most matching bits and

column 4, line 14, wherein bit match output, Hariguchi 855).

Claim 8:

Regarding Claim 8, combination of Melchior in view of Hariguchi 855 and further

in view of Hariguchi 946 teaches wherein the second table includes an action table

having a plurality of portions (column 7, lines 23-27, wherein each entry of the routing

table comprises a collection of CAM cells for storing bits of stored addresses, and a

masking circuit for masking a portion of the stored address bits and so forth, Hariguchi 855).

Claim 9:

Regarding Claim 9, combination of Melchior in view of Hariguchi 855 and further in view of Hariguchi 946 teaches wherein each of the plurality of portions is configured to be accessed by a corresponding one of a plurality of the selection signals (Refer to claim 1, wherein this limitation is substantially the same and therefore rejected under the same rationale, Hariguchi 855).

Claim 10:

Regarding Claim 10, combination of Melchior in view of Hariguchi 855 and further in view of Hariguchi 946 teaches wherein each of the plurality of portions corresponds to an action group (column 6, lines 47-50, wherein a subset of the multiple mapped subtrie values each include a contiguous set of one or more ones, the position of the contiguous set of one or more identifying values within the range, Hariguchi 946).

Claim 11:

Regarding Claim 11, combination of Melchior in view of Hariguchi 855 and further in view of Hariguchi 946 teaches wherein the action group includes a user programmable register for enabling one or more categories of actions (column 4, lines 25-35, respectively, Hariguchi 946).

Claim 12:

Regarding Claim 12, combination of Melchior in view of Hariguchi 855 and further in view of Hariguchi 946 teaches wherein the selection signal is generated in

response to a precedence determination (column 8, lines 57-67, wherein when a hit is

generated, lookup result is provided directly to selector 172 or used by optional adjunct

memory to produce Result A, i.e., an identifier of a value, range, or action to be taken,

and so forth and columns 9-10, lines 64-67 and lines 1-5, wherein to determine if a

range tuple is matched, control logic 191 generates (or these values are received from

another component) the mapped lookup values 192 for each of the range circuits 193A-

193M, which produce indications 197 whether there was a match, which are combined

by element 198 (e.g., an AND gate, AND mechanism, or other combination circuit or

logic) to produce hit/miss indication 199, which can be used by control 191 for further

processing or directly or indirectly provided to another component, Hariguchi 946).

Claim 13:

Regarding Claim 13, combination of Melchior in view of Hariguchi 855 and

further in view of Hariguchi 946 teaches wherein the action indication includes an action

to be performed on a packet (column 7, lines 15-27, respectively, Hariguchi 946).

5.   Claims 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Melchior (US Patent No. 6,226,710, Date of Patent: May 1, 2001) in view Hariguchi et al

(US Patent No. 6,717,946/Date of Filed: Oct. 31, 2002, hereinafter Hariguchi 946).

Claim 14:

Regarding Claim 14, Melchior teaches performing a search operation on a

searchable memory block (Refer to claim 1, wherein this limitation is substantially the

same/or similar, Melchior);

Melchior does not teach accessing a stored action group number in a first table,

the stored action group number corresponding to each hit resulting from the search

operation), the stored action group number including a group subfield and a precedence

number.

Melchior does not teach checking if the group subfields in the stored action

group number is enabled for any hits from the search operation.

Melchior does not teach allowing the hit for a group if the group subfield is

enabled.

Melchior does not teach determining a precedence based on the precedence

number to provide a search result for the group

Melchior does not teach selecting an action based on the search result from an

action table portion corresponding to the group

On the other hand, Harguchi 946 does teach:

accessing a stored action group number in a first table, the stored action group

number corresponding to each hit resulting from the search operation (column 8, lines

59-67, respectively, Hariguchi 946), the stored action group number including a group

subfield and a precedence number (Figure 4A ~ 4C,all features and column 13, lines 1-

50, respectively, Hariguchi 946);

It would have been obvious to one of the ordinary skill in the art at the time of

the invention to incorporate Hariguchi 946 into Melchior system. A skilled artisan

would have been motivated to combine as suggest by Hariguchi 946 [see abstract] for

mapping ranges of values into unique values of particular use for range matching

operations using TCAM, i.e., ternary content addressable memory.

checking if the group subfields in the stored action group number is enabled for

any hits from the search operation (column 4, line 46, wherein determining is defined

and column 8, lines 57-63, Hariguchi, 946);

allowing the hit for a group if the group subfield is enabled (column 9, lines 17-

32, respectively, Hariguchi 946);

suppressing the hit for the group if the group subfield is not enabled (column

9,line 32 and column 11, lines 20-22, respectively, Hariguchi 946);

determining a precedence based on the precedence number to provide a search

result for the group (column 8, lines 46-49, wherein an access control list the order of

values indicate relative priority to other values and this relative priority order must be

maintained, wherein range mapping and match identification system for performing

lookup operations and so forth, Hariguchi 946); and

selecting an action based on the search result from an action table portion

corresponding to the group (column 9, lines 17-21, respectively, Hariguchi 946).

Claim 15:

Regarding Claim 15, combination of Melchior in view of Hariguchi 946 teaches

wherein the performing the search operation includes searching a memory block having

a first type memory portion and a second type memory portion (Refer to claim 1,

wherein this limitation is substantially the same/or similar and therefore rejected under

the same rationale, Melchior).

Claim 16:

Regarding Claim 16, combination of Melchior in view of Hariguchi 946 teaches

wherein the first type memory portion includes static random access memory (SRAM)

(Refer to claim 2, wherein this limitation is substantially the same/or similar and

therefore rejected under the same rationale, Melchior)

Claim 17:

Regarding Claim 17, combination of Melchior in view of Hariguchi 946 teaches

wherein the second type memory portion includes ternary content addressable memory

(TCAM) (Refer to claim 3, wherein this limitation is substantially the same/or similar

and therefore rejected under the same rationale, Hariguchi 946).

Claim 18:

Regarding Claim 18, combination of Melchior in view of Hariguchi 946 teaches

wherein the accessing the stored action group number includes selecting an entry from

an action group number table (column 13, lines 21-31, wherein range will be split into

groups of width two bits and so forth and column 14, lines 20-21, wherein width can be

adjusted by selecting the width of the groupings of bits an the range mapping

mechanism, Hariguchi 946).

Claim 19:

Regarding Claim 19, combination of Melchior in view of Hariguchi 946 teaches

wherein the determining the precedence includes selecting a highest priority hit from

among a remaining group of hits (column 9, lines 22-32, Hariguchi 946).

Claim 20:

Regarding Claim 20, combination of Melchior in view of Hariguchi 946 teaches

wherein the action table includes a portion corresponding to each of the groups (Refer

to claim 10, wherein this limitation is substantially the same/or similar and therefore

rejected under the same rationale, Hariguchi 946).

Claim 21:

Regarding Claim 21, combination of Melchior in view of Hariguchi 946 teaches

wherein the selecting the action from the action table includes accessing the portion

corresponding to the group (Refer to claim 14, wherein this limitation is substantially

the same/or similar and therefore rejected under the same rationale, Hariguchi 946)..

Claim 22:

Regarding Claim 22, Refer to claim 14, wherein the limitations are substantially

the same/or similar and therefore rejected under the same rationale.

Prior Art of Record

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

1. Cheriton   (US Patent No. 7,002,965)

2. Hunter et al   (US Patent No. 6,223,172)

3. Brown et al   (US Patent No. 5,875446)

4. Hariguchi et al   (US Patent No. 6,717,946)

5. Hariguchi   (US Patent No. 6,307,855)

6. Melchior   (US Patent No. 6,226,710)

Response to Applicant Arguments

Applicant's arguments filed, with respect to the rejected claims in view of the cited references have been considered but are moot in view of applicant' s amended claims necessitate new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire

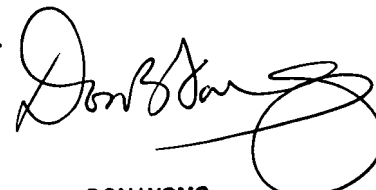later than SIX MONTHS from the date of this final action.

Point of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Rose whose telephone number is (571) 272-0749. The examiner can normally be reached on 8:00am - 4:30pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner' s supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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